THE PERSISTENT GAP: Exploring the Earnings Differential Between Recent Male and Female Postsecondary Graduates

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Ted Wannell

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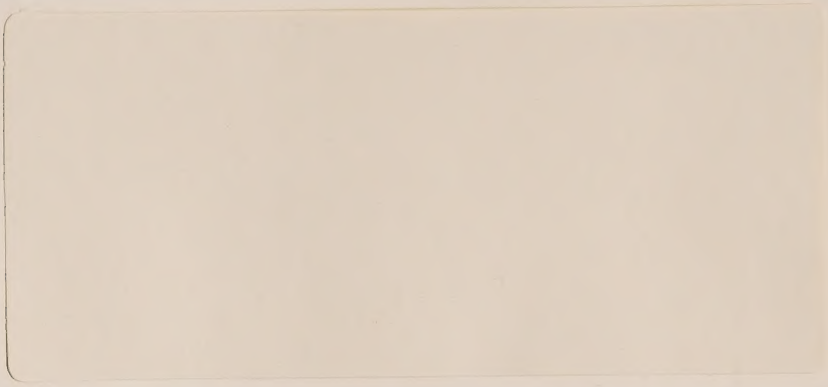

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Abstract

While the participation rate of women in postsecondary education and full-time jobs increased dramatically in recent years, the earnings gap between men and women has narrowed at a slower rate. The National Graduates Survey (1984) and the subsequent Follow-up of Graduates Survey (1987) provide a unique window on the earnings gap in a very specific cohort of well-educated individuals: 1982 graduates of Canadian universities and community colleges. The earnings differential between male and female graduates is analyzed through both descriptive and multivariate techniques.

The major observations include: men earn more than women in virtually every subgroup of graduates (Ph.D. holders being the one notable exception); the earnings gap tended to widen over time within this cohort; and, differences in the 'wage-generating' characteristics of men and women accounted for, at best, a third of the earnings gap. The concluding discussion covers three topics: the larger earnings gap among community college graduates, possible refinements to the multivariate model and the difficulty of proving discrimination exists using survey data.

Keywords

earnings, wages, graduates, university, community college, sex, gender, gap, differential, decomposition

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Summary

This report focuses on the female / male earnings differential of a very select group -- 1982 university and community college graduates who were employed full-time in 1984 or 1987. Two surveys, the National Graduates Survey (1984) and the Follow-up of Graduates Survey (1987), provide information on the labour market experiences in the first five years following graduation and thus a unique look at the female / male earnings gap.

With identical educational backgrounds, similar age profiles and about the same amount of labour market experience, this is the type of group where one would expect little or no earnings differential. Although the earnings gap in this young, well-educated cohort was smaller than that found in the overall labour force, female graduates earned less than males in almost every category examined.

The earnings gap among community college graduates was consistently larger than among the university graduates, but widened for both groups of graduates between 1984 and 1987. The female to male earnings ratio dropped from 87 percent to 82 percent among the university graduates, and from 83 percent to 79 percent among the community college graduates.

The earnings differential between male and female graduates within fields of study was generally smaller than the overall gap. For university graduates, the gap shrunk further when measured within degree levels (i.e. Bachelors, Masters and Ph.D) and fields of study (disappearing altogether for Ph.D. holders). Program length did not have the same effect for the community college graduates.

The male graduates of both types of schools were more likely than women to enter higher-paying occupations, even when controlling for field of study. Additionally, the earnings gap within particular occupations was generally larger than when viewed by field of study. The earnings gap is thus exacerbated by the movement of female and male graduates into different types of jobs.

A multivariate model is introduced to better control for the many factors affecting the earnings gap. To limit differences in labour market experience, the population for this analysis was restricted to those who were employed full-time at five separate time points between 1983 and 1987. Despite the controls, the model accounted for just one-third of the university and one-fifth of the community college earnings gap. Differing field of study distributions for men and women played the biggest role in the 'explained' proportion of the gap. The residual portion of the earnings gap cannot be explained by differences in the measured characteristics of men and women, and offers circumstantial evidence of differential treatment in the labour market.

The concluding discussion covers three topics. First, some explanations for the larger earnings gap among community college graduates are offered. Second, possible refinements to the multivariate model are discussed. Finally, the difficulty of "proving" discrimination with survey data is discussed.

Ackowledgements

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Of course, any errors in content or analysis are solely the responsibility of the author.

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Introduction

The rise in female labour market participation in recent decades is one of the most widely studied and well-documented phenomena of our time. The percentage of women engaged in paid work rose slowly from the late 1940s to the mid 1960s and from that point climbed quickly before levelling off somewhat in the mid 1980s. While the female participation rate remains somewhat below that for men, 40% of prime age (25-44), full-time workers are women.

As more and more women entered and remained in the labour market, a concurrent trend took place in postsecondary education. Postsecondary enrolment soared in the 1960s and 1970s due to the entry of a large cohort, increased institutional capacity (particularly the development of the community college system) and increasing participation rates. At the same time, female participation rates rose much faster than those for men. While women accounted for 37 per cent of undergraduate university enrolment in 1971, they made up approximately half of the undergraduate population by 1987. Furthermore, women are in the majority among the community college population.

While women became nearly equal participants in postsecondary education and a healthy minority in the full-time workforce, their average earnings and thus their returns to investment in education apparently remained well below their male counterparts. On the other hand, the earnings gap between women and men narrowed over time. In the past 30 years, the ratio of female to male full-time earnings rose from about one-half to just under two-thirds. Currently, the gap is smaller among the younger age groups and the more educated. Never-the-less, female earnings lag behind male earnings in nearly every measurable industry, occupation and educational grouping.[1]

The National Graduates Survey of 1984 (NGS) and the Follow-up of Graduates Survey in 1987 (FOG) yield a unique perspective on the recent status of the female / male earnings gap. The sampling frame for these surveys encompasses the 1982 graduates of all universities and community colleges in Canada.[2] This is precisely the type of framework in which one would least

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[1]Some researchers suggest that the industry and occupation coding schemes available on standard micro-datasets --even at the four-digit occupation and three-digit industry level -- may mask some within-group stratification which would help to explain the female / male earnings gap. (See Bielby and Baron, 1986).

[2]The graduates of vocational and trade programs were also surveyed but are not included in this report for two reasons. First, the entrance requirements to trade and vocational programs vary greatly, thus the graduates are a much less homogenous group with respect to age and years of education. Second, trade and vocational programs are so stratified by sex that female to male comparisons are subject to high sampling variability (due to small numbers in the minority group).

expect to find a significant earnings gap: a young, well-educated sample of individuals entering the labour market at approximately the same time. Once controls are in place for institution type, level of degree and field of study, men and women should enter the labour market on approximately equal footing. This does not appear to be the case. Within 2 years of graduation, female earnings are already well below male earnings. And the gap widens over the following three years. The purpose of this paper is to quantify and explore this discrepancy between male and female earnings.

This exploration of the earnings gap among recent graduates is divided into two parts. The first part concentrates on contextualizing and quantifying the difference in male and female earnings. The female / male earnings ratio for graduates is compared to that of the overall workforce and to workers the same age as the graduates. Next, earnings ratios are presented for detailed fields of study and, where possible, level of degree. The field of study ratios highlight those fields where the earnings gap is large or small (and in a very few cases, favours women). Similarly, ratios are presented by industry and occupation, which are then further cross-classified by field of study.

While the cross-tabulations showed narrower earnings gaps for some graduates, in almost all cases some difference remains. Is this remaining gap an indication of differential treatment in the labour market or is it perhaps due to a combination of factors that cannot be unravelled with cross-tabulations? And which of these factors are important? In the second section, a multivariate model is introduced in an attempt to at least partially answer these questions. Separate analyses were carried out for community college and university graduates. Typically, only one-fifth to one-third of the earnings gap could be attributed to the education and background differences between men and women. The remainder of the gap could not be explained by the model. These findings are consistent with previous studies using the same methodology.

The concluding discussion focuses on some issues that remain largely unanswered in the main body of the report. First, the earnings gap among community college graduates was consistently larger than among university graduates. Why should this be the case? Second, the multivariate analyses 'explained' relatively little of the earnings gap. Might alternative sets of variables or, indeed, model formulations be better suited to answering the questions at hand? Finally, can solid evidence of sex discrimination be gleaned from survey microdata?

A Brief Note on the Data

The National Graduates Survey (NGS), 1984, and the Follow-up of Graduates Survey (FOG), 1987, collected a wide range of information on the labour market experiences of 1982 community college and university graduates. Included on each survey was a question asking respondents to estimate their yearly

earnings (to the nearest thousand dollars) based on the job held at the time of the interview. Responses to this question typically contain two digits (ie. 10-99 thousand). To avoid any representation of spurious accuracy most figures in this paper are also reported in two digit numbers.

The analysis in this report is limited to those employed full-time at the time of each survey. Since the number of hours worked is highly variable for part-time workers and the surveys did not query the number of hours worked, this condition ensures that approximately equal amounts of labour are being compared. It also follows that the earnings figures approximate full-time, full-year earnings due to the way the question was asked. The full-time restriction yields the following maximum sample sizes for the descriptive tables:

	1984	1987
University Graduates		
Male	5141	4986
Female	4032	3689
Total	9173	8675
Community College Graduates		
Male	4291	3028
Female	3485	3073
Total	6776	6101

The exact sample sizes for each table will be somewhat smaller due to missing values for the variables under study. Cell values with a coefficient of variation greater than 25% are suppressed (denoted by '..'). Cell values with a coefficient of variation between 16.5% and 25% are marked by an asterisk (*).

A much more restrictive definition was used in the multivariate analysis: only those employed full-time at each of 5 separate timepoints were included. The resultant maximum sample is 5971 (3582 males and 2389 females) for university graduates and 3615 (1802 males and 1813 females) for community college graduates. Working samples are substantially smaller due to missing values among the many variables included in the analysis.

More detailed information on the surveys is available from the Household Surveys Division in the form of users' guides and methodology reports.

The Earnings Gap Between Male and Female Postsecondary Graduates

The existence of an earnings gap between men and women is not news. Until recently, traditional family roles dictated a division of labour within the household such that the majority of married women were engaged in unpaid household and child-rearing activities. Since most women's paid working careers ended at marriage or the birth of their first child, most women did not accumulate the skills and experience necessary to climb the salary ladder. Thus a wide gulf existed between the salaries of working men and women.

But times change. A combination of social, demographic and economic trends have resulted in the increased participation of women in the full-time workforce. Fewer women are leaving the labour force when they marry. Interruptions for childbirth have been reduced by the long-term drop in fertility and the costs are subsidized through the Unemployment Insurance plan. As more and more women entered and remained in full-time paid jobs, the salary gap narrowed, yet it remains substantial.

In 1987, females working full-time for the full year earned, on average, a third less than their male counterparts. Of course, a gap of this size reflects many differences between the female and male workforce: age structure, education, occupation, industry of employment and accumulated experience. The NGS/FOG panel enables one to control for these differences. Furthermore, the NGS/FOG panel all entered the labour market at approximately the same time. Since labour market conditions and the return to certain individual characteristics vary over time, the simultaneous entry of the panel is an important feature. The effect of people with similar qualifications entering the labour force at different times cannot be directly measured with normal survey data.[3]

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[3]These 'period effect interactions' are the result of varying rewards to different characteristics over time combined with distributional changes in those characteristics over time. Consider the following: a greater premium was accorded to a university degree 20 years ago when male graduates far outnumbered female graduates and graduates made up a smaller proportion of the overall population. Mixing this subpopulation with more recent entrants disguises the interactions between sex, education and the timing of the entry into the workforce.

This report concentrates on those graduates working full-time in either 1984 or 1987. While this restriction creates a more even basis for comparison, it makes for a conservative measure of the earnings gap because more women work part-time. In 1987, for example, 1982 female university graduates were about twice as likely, and female community college graduates three times as likely, to be working part-time as their male classmates (see Table 1.). Despite the population restrictions and the number of control variables, a female / male earnings gap exists for almost all subgroups of graduates. And the gap appears to widen over time.

Looking at the 1982 university graduates, females employed fulltime in 1984 earned an average of 24 thousand -- or 87 percent of the male average of 27 thousand. By 1987, the ratio of female to male earnings had dropped to 82 percent, with female earnings averaging 31 thousand compared to 38 thousand for males.

The earnings gap is slightly wider for community college graduates. The 1984 earnings of full-time female graduates averaged 83 percent of male earnings, 17 thousand compared to 21 thousand. As with the university graduates, the gender differential increased with time. In 1987, full-time female earners brought in an average of 79% (19 thousand) of the earnings of their male counterparts (26 thousand).

Both community college and university graduates had smaller earnings gaps than the full-time workforce of approximately the same age. Among the general working population the same age as the 1982 university (community college) graduates, females earnings averaged 18 thousand (15 thousand) and males 25 thousand (20 thousand) -- a ratio of 70 percent (72 percent).[4] Similarly in 1987, the age-weighted female workforce comparable to the university (community college) graduates earned 71 percent (69 percent) of the male average. Age-weighting tends to narrow the earnings gap because male and female wages are closer together in the younger age groups which contain the majority of graduates.

Age can also act as a proxy for experience -- older individuals tend to have more experience and earn higher wages. Therefore any differences in the age distribution of male and female graduates may tend to widen the earnings gap.

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[4]Age-weighted average earnings are calculated by multiplying the average earnings for a particular age group (from **Earnings of Men and Women**, Statistics Canada Catalogue 13-217) by the proportion of graduates in that age group and summing across age groups.

Table 1. Percentage of 1982 Graduates Employed at Various Timepoints, by Sex and Full-tine/Part-time Status

University Graduates						
Date	Males			Females		
	Full-time	Part-time	Total	Full-time	Part-time	Total
	%	%	%	%	%	%
Jan. 1983	61	10	71	57	17	74
Oct. 1983	68	9	77	63	16	79
May 1984	78	6	84	71	12	83
Jan. 1986	81	6	87	73	12	85
March 1987	84	5	89	74	12	86

Community College Graduates						
Date	Males			Females		
	Full-time	Part-time	Total	Full-time	Part-time	Total
	%	%	%	%	%	%
Jan. 1983	61	10	71	61	17	78
Oct. 1983	74	8	82	69	15	84
May 1984	82	5	87	73	13	86
Jan. 1986	81	4	85	71	13	84
March 1987	83	4	87	71	14	85

If the female / male earnings ratio varies by age, then differing age distributions for male and female graduates could account for some of the earnings gap. Differences in starting ages, program length, degree level, labour force attachment or employer preferences may affect the age distribution of each sex. However, male and female graduates display similar age profiles. Furthermore, the earnings gap does not vary as much by age group as it does in the general workforce.

The difference in average age between male and female graduates (employed full-time) is only about half a year at both time points. Among university graduates females have the higher average age, while the situation is reversed for community college graduates. More females, from both types of institution, fall into the youngest age category. The percentage of females in older age categories (over 45) is also slightly higher in each group. The effect of these relatively small differences in age distribution between the sexes is further diminished by the invariant (relative to the general workforce) earnings gap by age among the graduates.

In contrast to the small age differences, the divergent field of study distributions of males and females are striking (see Tables 2a. and 2b.). Most fields tend to be dominated by one sex or the other. The differing field of study distribution can affect the overall earnings gap. If men tend to gravitate to high-reward fields of study, the gap could be inflated. A simple method to check for this bias is to compare the within-field earnings ratios to the overall ratio. If the average of the within-field ratios is significantly lower than the overall ratio, differing field of study choices by men and women account for some proportion of the earnings gap.

This field of study effect is more evident among university than community college graduates. Among university graduates, the within-field female / male earnings ratio averaged 89 percent in 1984 and 85 percent in 1987, narrowing the overall earnings gap by 2 and 3 percentage points, respectively (see Table 3a.). Thus there is some evidence that males tend to choose university fields of study that lead to higher-paying jobs. The within-field average actually widened the gap for community college graduates in 1984 (from 83 percent to 81 percent), but had the expected effect of closing the gap (from 79 percent to 81 percent) in 1987 (see Table 3b.). The ambiguous indications for community college graduates stem from much smaller between-field differences in average earnings. The earnings in the highest-paid college field averaged just 50 percent more than in the lowest-paid field. In contrast, graduates in the top-paying university field earned, on average, 5 times (ie. 400 percent) more than those in the lowest-paid field.

Even though the earnings gap is generally smaller within fields of study, women graduates of virtually all programs still earn less than men.[5] In fact, in only one field from each type of institution -- Political Science at universities and Other Applied Arts at community colleges -- did female graduates earn at least as much as men in 1984. And in both instances the earnings pendulum had swung back in favour of the men by 1987. Note again that the earnings gap was generally much larger within individual community college fields than university fields.

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[5]Degree level has not been controlled for here due to small sample sizes within the detailed fields of study. Since more men than women earned advanced degrees (22% compared to 16% by 1987), there is a slight bias towards a wider earnings gap.

Table 2a. Distribution of University Field of Study, 1982 Graduates Employed Full-time in 1987, by Sex

Field of Study	Males	Females
	%	%
1. Education	15.7	27.7
2. Fine Arts	1.5*	1.3
3. Applied Arts	..	1.4*
4. Journalism	..	..
5. Other Humanities	7.8	13.7
6. Sociology, Anthropology, Demography	1.7	4.1
7. Criminology	..	..
8. Law	3.4	2.6
9. Economics	5.3	1.7*
10. Geography/Environment	4.1	2.2
11. Political Science	2.3	1.9
12. Psychology	2.3	6.4
13. Other Social Sciences	22.0	14.9
14. Agriculture	1.5*	..
15. Biochemistry, Biology, Zoology	2.4	2.1
16. Home Economics	..	1.3*
17. Veterinary	..	..
18. Architecture	0.9*	..
19. Engineering	14.1	1.4*
20. Forestry	0.9*	..
21. Lanscape Architecture	..	..
22. Dentistry	0.9*	..
23. Medicine	2.7	1.8
24. Nursing	..	4.8
25. Optometry	..	..
26. Pharmacy	..	1.2*
27. Public Health	..	..
28. Computer Sciences	3.4	1.2*
29. Math	2.3	1.3*
30. Chemistry, Geology, Metal	1.8	3.2
31. Meteorology	..	..
32. Physics/Other	..	..
Total	100	100
Weighted Number	31 200	28 500

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Table 2b. Distribution of Community College Field of Study, 1982 Graduates Employed Full-time in 1987, by Sex

Field of Study	Males	Females
	%	%
1. Fine Arts	..	1.4*
2. Commercial/Promotion	..	1.1*
3. Graphic & Audio Visual Arts	2.7	1.3*
4. Mass Communications	1.2*	..
5. Other Applied Arts	..	2.1
6. Journalism	..	..
7. Library Sciences	..	1.2*
8. Nursing	1.8	18.0
9. Medical Technologists	3.0	8.0
10. Medical Equipment Technologies	..	..
11. Other Health	..	1.0*
12. Chemical Technologies	1.8	0.9*
13. Electrical & Electronic Tech	16.1	..
14. Math/Computer Sciences	6.3	4.4
15. Transportation Technologies	1.2*	..
16. General Engineering Tech	6.3	..
17. Mechanical Engineering Tech	6.8	..
18. Architecture/Construction Tech	6.3	0.9*
19. Industrial Engineering Tech	3.2	..
20. Agriculture	3.2	1.6
21. Primary Industries	2.8	..
22. Process Industries	1.8	..
23. Environment Conservation	1.1*	..
24. Protection & Correctional Services	4.3	1.2*
25. Social Services	1.1*	3.9
26. Sports and Recreational	1.1*	2.7
27. Other Social Sciences	1.5*	7.3
28. Management & Administration	16.7	35.4
29. Merchandising & Sales	4.4	2.7
30. Service	1.7	1.0*
Unweighted Average	100	100
Weighted Number	15 300	17 600

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Degree level (or program length at community colleges) is another variable that accounts for some salary stratification. University graduates with doctorates employed full-time in 1984 earned 45 percent more (35 percent more in 1987) than those with undergraduate degrees, with masters-level graduates occupying the middle ground (see Table 4a.). The earnings gap was largest among masters graduates, with ratios of 85 percent in 1984 and 81 percent in 1987, compared to 90 percent and 83 percent for undergraduates. The gap is virtually nonexistent at the doctorate level: women PhD's earned 1 percent more than men in 1984 and 1 percent less in 1987.

Program length made very little difference in the average earnings of community college graduates (see Table 4b.). The annual salary of those who graduated from programs of one year or less averaged just 1 thousand less than those who graduated from two or three year programs. The female / male earnings ratio also varied little by program length, except that it was substantially lower in 1984 for the one-year-or-less group.

Combining the effects of field of study and degree level (program length) should then narrow the earnings gap somewhat for university graduates and have little effect for community college graduates. And this is indeed the case. Averaged across 10 major fields of study and three degree levels, female university graduates earned 94 percent of the salaries of their male counterparts in 1984 and 92 percent in 1987. Remember that the overall ratios were 87 percent and 82 percent in the same years. On the other hand, the same calculation for community college graduates has little effect on the earnings gap. In fact, the earnings gap increased by one percentage point at each time point when the female / male ratio was averaged across field of study and program length.

To this point graduates have been classified according to characteristics determined before they entered the labour market (i.e. field of study, degree level, program length, age), but not by the characteristics of the actual job held. Jobs are normally classified by full-time/part-time status, occupation (defined by the type of duties performed) and the industry in which they are held (classified by the main product or service of the employer). Since only full-time jobs have been included so far, this discussion will be limited to occupation and industry.

Table 3a. Female to Male Earnings Ratios 1982 University Graduates Employed Full-time in 1984or 1987 by Field of Study

Field of Study	Female/Male Ratio 1984	Female/Male Ratio 1987
	%	%
1. Education	87	86
2. Fine Arts	96	89*
3. Applied Arts	..	..
4. Journalism	..	..
5. Other Humanities	98	94
6. Sociology, Anthropology, Demography	99	97
7. Criminology	..	..
8. Law	88	95
9. Economics	88	75
10. Geography/Environment	83	82
11. Political Science	104	86
12. Psychology	83	82
13. Other Social Sciences	90	86*
14. Agriculture	..	..
15. Biochemistry, Biology, Zoology	90	95
16. Home Economics	..	..
17. Veterinary	..	..
18. Architecture	..	..
19. Engineering	89	89*
20. Forestry	..	..
21. Lanscape Architecture	..	..
22. Dentistry	..	..
23. Medicine	81	87
24. Nursing	..	..
25. Optometry	..	..
26. Pharmacy	..	..
27. Public Health	..	..
28. Computer Sciences	95	91*
29. Math	97	93*
30. Chenistry, Geology, Metall	90	84
31. Meteorology	..	..
32. Physics/Other	..	..
Unweighted Average	89	85
Weighted Average	87	82

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Table 3b. Female to Male Earnings Ratios 1982 Community College Graduates Employed Full-Time in 1984 or 1987 by Field of Study

Field of Study	Female/Male Ratio 1984	Female/Male Ratio 1987
	%	%
1. Fine Arts	..	..
2. Commercial/Promotion	..	..
3. Graphic & Audio Visual Arts	100*	75*
4. Mass Communications	69	..
5. Other Applied Arts	101*	93*
6. Journalism	..	..
7. Library Sciences	..	..
8. Nursing	96	88
9. Medical Technologists	75	82
10. Medical Equipment Technologies	..	..
11. Other Health	..	..
12. Chemical Technologies	87*	83*
13. Electrical & Electronic Tech	..	..
14. Math/Computer Sciences	89	81
15. Transportation Technologies	..	..
16. General Engineering Tech	..	..
17. Mechanical Engineering Tech	..	..
18. Architecture/Construction Tech	85*	82*
19. Industrial Engineering Tech	..	..
20. Agriculture	85	70
21. Primary Industries	..	..
22. Process Industries	..	..
23. Environment Conservation	..	..
24. Protection & Correctional Services	81*	81*
25. Social Services	79*	73*
26. Sports and Recreational	66*	66*
27. Other Social Sciences	75*	79*
28. Management & Administration	75	72
29. Merchandising & Sales	73	63
30. Service	82	81*
Unweighted Average	81	81
Weighted Average	83	79

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

The earnings gap between female and male graduates interacts with industry or occupation in two ways. First, gender differentials may exist within industries or occupations and be inherited by the new entrants. Secondly, the process of matching graduates to jobs may sort females into lower-paying industries and occupations. Since some prior sorting has taken place with regard to field of study, it is necessary to cross-classify industry and occupation with field of study to properly isolate either effect. Unfortunately, sample sizes quickly become untenably small crossing industry or occupation with field of study and sex. Accordingly, sex differentials by industry and occupation are presented first, followed by highly aggregated cross-classifications with field of study.

Among university graduates the earnings gaps within occupations were larger than within fields of study, while the results for community college graduates were less clear cut. Across 15 occupations, the female / male earnings ratio for university graduates averaged 87 percent in 1984 and 83 percent in 1987 (see Table 5a.). For community college graduates, the average ratio was 81 percent in both years (see Table 5b.). Teaching (other than university) and math / computer science were the most equitable occupations for university graduates -- the female / male earnings ratio for each was above 90 percent in both years. Similarly, nursing and other health occupations displayed the smallest gender differential for community college graduates. The earnings gap tended to be larger in the less-skilled occupations (ie. clerical, sales, service and blue collar) for both groups of graduates.

Gender differentials were generally larger when viewed across industry boundaries, probably due to some occupation stratification by sex within industries. Taken by industry, the average ratio for university (community college) graduates dropped to 83 percent (80 percent) in 1984 and 78 percent (both groups) in 1987 (see Tables 6a. and 6b.). The most equitable industries correspond to the most equitable occupations mentioned above -- education institutions for university graduates and health institutions for community college graduates. Those same health institutions show a large earnings gap for university graduates, a function of the salary dichotomy between doctors (mainly male) and nurses (almost exclusively female). Finance, insurance and real estate had larger than average gender differentials regardless of the institution of graduation.

In order to cross-tabulate industries and occupations with fields of study, some aggregation was necessary. Industry and occupation categories were ordered by the average salary level in 1987[6] and assigned to low, medium or high groups. The aggregation was specific to community college or university graduates, since the ordering of industries / occupations was not the same. The field of study aggregations previously crossed with degree level or program length were also employed here.

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[6]Greater salary dispersion existed between industry and occupation groups in 1987 than in 1984, yielding better separation between the collapsed low, medium and high salary groups.

Table 4a. Female to Male Earnings Ratios 1982 University Graduates Employed Full-Time in 1984 or 1987, by Field of Study and Program Length

Field of Study	Program Length	Female/Male Ratio 84	Female/Male Ratio 87
		%	%
All Fields	Undergrad Univ	90	83
	Master/Grad Cer	85	81
	Doctorate	101	99
Education	Undergrad Univ	92	89
	Master/Grad Cert	83	86
	Doctorate	91	88
Fine Arts and Humanities	Undergrad Univ	99	91
	Master/Grad Cert	95	95
	Doctorate	105	94
Commerce, Economics and Law	Undergrad Univ	87	87
	Master/Grad Cert	87	89
	Doctorate	..	..
Other Social Sciences	Undergrad Univ	94	90
	Master/Grad Cert	89	84
	Doctorate	93	91
Agriculture and Biological Sciences	Undergrad Univ	91	80
	Master/Grad Cert	89	84
	Doctorate	87	89
Engineering	Undergrad Univ	91*	89*
	Master/Grad Cert	80*	..
	Doctorate	111	119
Medical and Health Sciences	Undergrad Univ	65	54
	Master/Grad Cert	77	50
	Doctorate	158*	118*
Math and Physical Sciences	Undergrad Univ	95	93
	Master/Grad Cert	83*	89*
	Doctorate	94*	94*
Unweighted Average		94	92
Weighted Average		87	82

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Table 4b. Female to Male Earnings Ratios 1982 Community College Graduates Employed Full-Time in 1984 or 1987, by Field of Study and Program Length

Field of Study	Program Length	Female/Male Ratio 84	Female/Male Ratio 87
		%	%
All Fields	1	76	76
	2	85	78
	3	84	79
Arts and Humanities	1	..	..
	2	83	80
	3	90	80
Health Science	1	74*	86*
	2	99	88
	3	81	79
Other Engineering Technologies	1	..	..
	2	91*	88*
	3	83	75
Electronic, Math and Computer Sciences	1	98*	..
	2	86	81
	3	94	92
Mechanical and Structural Engineering Technology	1	..	..
	2	98	85*
	3	..	..
Natural Sciences and Primary Industries	1	..	..
	2	77	74
	3	81	..
Social Sciences and Services	1	..	..
	2	74	68
	3	72	69
Secretarial Sciences and Merchandising	1	77	81
	2	73	66
	3	77	65
Management and Administration	1	71*	73*
	2	78	73
	3	76	77
Unweighted Average		82	78
Weighted Average		83	79

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously
Program Length: 1 - 1 Year or Less
2 - 2 Years
3 - 3 years or longer

Table 5a. Female to Male Earnings Ratios 1982 University Graduates Employed Full-Time in 1984 or 1987 by Occupation

Occupation	Female/Male Ratio 1984	Female/Male Ratio 1987
	%	%
1. Managers	81	83
2. Management Related	88	84
3. Physical and Life Sciences	88	89
4. Architecture, Engineering	88*	90*
5. Math, Computer Sciences	93	91
6. Social Sciences, Religion	90	89
7. University Teaching	78	81
8. Other Teaching	94	93
9. Health Diagnosis	71	81
10. Nursing, Other Health	94	82
11. Arts, Recreational	93	86
12. Clerical	79	79
13. Sales	75	69
14. Service Occupation	80*	74*
15. Blue Collar	98	74*
Unweighted Average	86	83
Weighted Average	87	82

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Table 5b. Female to Male Earnings Ratios 1982 Community College Graduates Employed Full-Time in 1984 or 1987 by Occupation

Occupation	Female/Male Ratio 1984	Female/Male Ratio 1987
	%	%
1. Managers	81	77
2. Management Related	88	83
3. Physical and Life Sciences	89	89
4. Architecture, Engineering	88	87
5. Math, Computer Sciences	90	89
6. Social Sciences, Religion	87	81*
7. Other Teaching	69	75
8. Nursing, Other Health	94	93
9. Arts, Recreational	97	87
10. Clerical	83	77
11. Sales	71	63
12. Service Occupation	64	64
13. Blue Collar	79	74
Unweighted Average	81	81
Weighted Average	83	79

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Table 6a. Female to Male Earnings Ratios 1982 University Graduates Employed Full-Time in 1984 or 1987 by Industry

Industry	Female/Male Ratio 1984	Female/Male Ratio 1987
	%	%
1. Primary Industries	80*	78*
2. Manufacturing and Construction	82	79
3. Transportation, Communications and Utilities	85	89
4. Wholesale Trade	88*	80
5. Retail Trade, Consumer Services	83	79
6. Finance	74	75
7. Insurance and Real Estate	71	64
8. Education	92	91
9. Health	74	60
10. Services to Business Management	83	84
11. Public Administration	83	87
Unweighted Average	83	78
Weighted Average	87	82

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Table 6b. Female to Male Earnings Ratios 1982 Community College Graduates Employed Full-Time in 1984 or 1987 by Industry

Industry	Female/Male Ratio 1984	Female/Male Ratio 1987
	%	%
1. Primary Industries	70	66
2. Manufacturing and Construction	81	74
3. Transportation, Communications and Utilities	76	76
4. Wholesale Trade	81	73
5. Retail Trade, Consumer Services	74	74
6. Finance	83	74
7. Insurance and Real Estate	62	57
8. Education	84	84
9. Health	83	88
10. Services to Business Management	80	78
11. Public Administration	81	81
Unweighted Average	80	78
Weighted Average	83	79

Note: .. - sample size too small to publish
*** - relatively small sample size, interpret cautiously**

The female / male earnings ratios across these field of study and industry / occupation groups varied little from the overall ratio. This is not surprising given the high level of aggregation. On the other hand, more men seem to end up in high-paying industries and occupations.

The movement of male graduates into better jobs is more apparent along occupation than industry lines. Looking at the percentage of male and female graduates of each field of study working in high-salary occupations, consistently higher percentages of males end up in the top jobs. There were no exceptions to this rule among university fields (see Table 7a.). The sole exception among community college fields was Electronics/Math/Computer Science: 54 percent of the female graduates were in high-salary occupations compared to 39 percent of the male graduates (see Table 7b.).

Table 7a. Percentage of Full-time Employed 1982 University Graduates Working in High Salary Occupations and Industries, by Field of Study and Sex

Field of Study	Percentage of Each Cell in High Salary Occupations		Industries	
	Male %	Female %	Male %	Female %
Education	19	6*	6*	8
Fine Arts and Humanities	20	18	14*	14
Commerce, Economics and Law	44	28	13	16
Other Social Sciences	37	21	24	29
Agriculture and Biological Sciences	36	27	30*	31*
Engineering	77	66	23	..
Medical and Health Sciences	76	22	76	72
Math and Physical Sciences	59	52	21	23
All Fields	45	20	20	23

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Table 7b. Percentage of Full-time Employed 1982 University Graduates Working in High Salary Occupations and Industries, by Field of Study and Sex

Field of Study	Percentage of Each Cell in High Salary Occupations		Industries	
	Male %	Female %	Male %	Female %
Arts and Humanities	11	10	45	42
Health Science	..	3	24*	5
Other Engineering Technologies	32	..	73	65*
Electronic, Math and Computer Sciences	39	54	60	41
Mechanical and Structural Engineering Technology	31	..	72	..
Natural Sciences and Primary Industries	12*	..	81	58*
Social Sciences and Services	..	..	60	16
Secretarial Sciences and Merchandising	32	9	33	28
Management and Administration	20	9	43	34
All Fields	45	20	58	24

Note: .. - sample size too small to publish
* - relatively small sample size, interpret cautiously

Male community college graduates of every field were also more likely to work in high-paying industries than their female counterparts. In contrast, a higher percentage of female university graduates worked in high-paying industries in 1987 than did male graduates. This overall advantage for women was mirrored within 4 fields of study in 1987. Since industry-averaging did little to narrow the earnings gap for university graduates, different occupation distributions by sex (at least at this highly aggregated level) seems to be the more important factor for this group. Among community college graduates, men tended to enter higher-paying occupations **and** industries. This 'double whammy' may partially explain the larger overall earnings gap in this cohort.

Summary

The female / male earnings gap is smaller among recent community college and university graduates than found in the overall working population of a similar age. Within field of study earnings differentials tend to be smaller than the overall gap. Higher percentages of men tend to be found in fields of study that command higher salaries. Adding degree level to fields of study further narrows within cell earnings gaps, because more men obtain advance degrees with higher salary returns. Program length does not have the same effect on the earnings gap for community college graduates. Earnings gaps within industries and occupations were generally larger than within fields of study. A higher percentage of men than women entered high-paying occupations, even when controlling for aggregated field of study. A similar sex-stratification by industry favoured male community college graduates, but not male university graduates.

Decomposing the Female / Male Earnings Differential

In the previous section, the earnings gap between male and female graduates was categorized by only one or two variables simultaneously. While further cross-classifications or more detailed categories might create more comparable groups, small within-cell sample sizes severely limit the range of such analyses. On the other hand, a multivariate approach allows the effects of a number of variables to be studied simultaneously and the results to be assessed by standard test scores. In this section, a multivariate technique known as decomposition is used to analyze the gender differential in earnings.

The decomposition technique is based upon linear regressions of the earnings of two different groups; in this case, male and female graduates. The regression equations are structured on a human capital model: earnings are modelled as a function of education and experience (investment in human capital), while controlling for background or demographic characteristics. As was noted in the previous section, at least some of the earnings gap is due to differences in the courses of study chosen by men and women. The same may hold true for experience or any of a range of background characteristics. The decomposition technique is primarily a tool for estimating the proportion of the earnings gap attributable to the measured differences in human capital and background characteristics of men and women. The remaining difference in earnings is referred to as the residual component. The regression coefficients allow the residual difference to be subdivided into differential returns to individuals' characteristics.

It is important to remember that the decomposition results are estimates subject to both specification and measurement error. The results can be affected by unmeasured human capital characteristics or self-selection (e.g. a graduate's choice of one occupation over another for non-monetary reasons). Accordingly, decomposition cannot provide direct evidence of wage discrimination. On the other hand, it can suggest which characteristics might be differentially rewarded. A brief description of the decomposition methodology follows.

Methodology

The 'non-discriminatory' decomposition technique outlined by Cotton (1988) was employed in this study. This technique is a variant of a methodology that dates back to the 1950s and has appeared in economic, sociological and demographic literature.[7]

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[7] For a more complete attribution of the history of the technique, see Cotton (1988) or Gunderson (1988).

Consider the following earnings equation:

$$\ln W = b X + u$$

where $\ln W$ is the natural log of yearly earnings[8]; X is a (k,j) matrix of k observed data values for j variables, b is a vector of j coefficients measuring returns to those variables and u is the error term. Identical earnings equations are estimated for sub-samples of men and women using ordinary least squares (OLS). Once the coefficients are estimated, the error term drops out, the OLS estimators $\hat{b}$ replace b and the superscripts m and f identify the male and female equations; resulting in

$$\ln W^f = \hat{b}^f X^f$$

$$\ln W^m = \hat{b}^m X^m.$$

One property of OLS estimators is that the product of the coefficients and associated variable means sum to the mean of the independent (left-side) variable, so that

$$\overline{\ln W^f} = \hat{b}^f \overline{X}^f$$

$$\overline{\ln W^m} = \hat{b}^m \overline{X}^m.$$

The decomposition technique centres on the fact that the difference in mean earnings is a simple function of explanatory variable means and the **estimated** return to these characteristics. Therefore, if men and women received the same return to their endowments, $b^f = b^m$, and the difference in earnings would be solely attributable to differing endowments.

Cotton recognized that in the absence of differential rewards, the return to endowments would fall somewhere between those for the currently advantaged and disadvantaged. He proposes that these 'non-discriminatory' coefficients be estimated as the weighted average of the male and female coefficients. Therefore,

$$\hat{b}^* = p^m \hat{b}^m + p^f \hat{b}^f ,$$

where $\hat{b}^*$ is the vector of non-discriminatory coefficients and p^m and p^f are the proportions of the total population that are female and male.

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[8] The natural log of earnings is used so that the estimated coefficients approximate the proportionate effect on earnings of changes in the variables on the right-hand side of the equation (Gunderson, 1988).

With several simple steps that need not be repeated here, Cotton arrives at a decomposition of the earnings differential containing three terms:

$$\overline{\ln W^m} - \overline{\ln W^f} = \hat{b}^* (\bar{X}^m - \bar{X}^f) + \bar{X}^m (\hat{b}^m - \hat{b}^*) + \bar{X}^f (\hat{b}^* - \hat{b}^f).$$

The first term represents the component of the earnings gap attributable to differing endowments (human capital and background characteristics). The second and third terms divide the residual earnings differential into male treatment advantage (higher than expected return to endowments) and female treatment disadvantage (lower than expected return to endowments).

The dollar values expressed for these components sum to the difference in the **geometric** mean earnings of men and women, as opposed to the arithmetic mean used in the previous section. The geometric mean is simply the anti-log of the average log earnings. That is

$$e^{(\overline{\ln W})}.$$

The earnings equations were estimated for graduates of both types of institution for 1984 and 1987. **The population was limited to graduates with valid earnings data in 1984 and 1987 who were working full-time at each of the five time points covered in the surveys.**[9] Thus the subpopulations of females and males have a history of strong and more-or-less equal attachment to the labour force. This definition yields a conservative estimate of the earnings gap as more women have interrupted work histories or work part-time.[10] The sensitivity of the results to alternative population definitions was tested and will be discussed later.

The independent (explanatory) variables included controls for age, language, province, interprovincial mobility, parents' postsecondary education, marital status, children, work experience prior to studies, detailed field of study, degree level (or program length) and public sector employment. Note that industry and occupation controls are not included in the model. The process of matching graduates to jobs in different industries and occupations may be conditioned on sex. Therefore, controls for industry and occupation may mask one element of earnings discrimination (Gunderson, 1988). On the other hand, a public sector employment control is included since the wide implementation of target group programs and the stated merit

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[9] These time points are: January 1983, October 1983, June 1984, January 1986 and March 1987.

[10] For example, 33 percent of the female graduates met these criteria to be included in the multivariate analysis, compared to 41 percent of the males.

principle of hiring and advancement in that sector may create a separate set of job matching rules. A complete list of independent variables and definitions is included in Appendix I.

Results

The differing human capital and background characteristics (endowments) of men and women accounted for relatively little (between 18 and 35 percent) of the overall earnings gap in the model. This 'explained' proportion was nearly twice as large for the university graduates than the community college graduates. Differing field of study patterns for each sex accounted for most of the 'explained' proportion of the gap. Public sector employment was also an important factor, but usually acted in the opposite direction to field of study -- it tended to be an equalizing characteristic. The residual difference was usually a fairly even split between the male treatment advantage and female treatment disadvantage components.

Looking first at the university graduates, the geometric mean earnings of men exceeded the female mean by $3700 in 1984 and $7000 in 1987 (see Table 8.). In both years, the differing endowments of men and women accounted for 35 percent of the earnings gap (i.e. $1300 in 1984 and $2500 in 1987). Divergent field of study distributions were the most important factors -- making up 133 percent of the net difference in 1984 and 84 percent in 1987.[11] The higher percentage of men with masters degrees was also a large factor in 1984, but less so in 1987. Age (in both years) and public sector employment (in 1984) were the strongest factors narrowing the explained earnings gap. The women in the population were, on average, older than the men, with age yielding positive returns. Similarly, a higher percentage of females worked in the public sector in both years. However, public sector employment yielded positive returns in 1984 but negative returns in 1987 -- largely due to a high premium accruing to men for working in the private sector in 1987. Therefore, the higher percentage of women in the public sector was an equalizing variable in 1984, but helped to widen the earnings gap in 1987. In a similar vein, women earned higher returns to previous full-time work experience (particularly 3 years and over) in 1984, but this effect dissipated by 1987.

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[11] Since some variables can have the opposite effect to the overall trend (i.e. favour females), the absolute sum of differences can easily exceed the net sum of differences. The subtotal of 133 percent for fields of study in 1984 indicates that other than field of study, women had 'better' wage-generating characteristics than men (e.g. higher average age, more public sector employment, etc.)

Differences in endowments played a much smaller role in the earnings gap between male and female community college graduates. Differing characteristics accounted for $800 of the $4200 gap in 1984 (19 percent) and $1200 of the $6900 gap in 1987 (18 percent) -- about half the proportion explained by the university models (see Table 9.). The residual gap consisted of a 40 percent (39 percent) male advantage and 41 percent (43 percent) female disadvantage in 1984 (1987). As with the university graduates, gender differences in the field of study distribution accounted for the largest proportion of the explained gap.[12] In contrast to the university grads, male community college graduates were older, on average, than their female counterparts, and received higher returns to age. This significantly widened both the explained and residual components of the earnings gap. Public sector employment was an equalizing factor in both years, although the effect was much stronger in 1984 than in 1987. While more men had full-time work experience prior to their studies, adding to the explained component of the gap, women earned higher returns to their prior experience, thus narrowing the residual component of the earnings differential.

To test the sensitivity of the results to different population definitions, two further decompositions were run on the 1987 earnings of university graduates. The first further restricted the population to those who had worked for the same employer continuously since the first interview. This condition virtually ensured an uninterrupted work history (strong labour force attachment) and eliminated any bias due to inter-firm mobility. While the overall earnings differential was slightly smaller ($6500 compared to $7000), the results were very similar. The second alternative population consisted of those who were employed full-time at the time of each survey, but had at least one interruption at some other time. The mean earnings of men and women in this population differed by only $1000, both earning substantially less than those with uninterrupted jobs. The smaller sample size of this group and the small earnings differential preclude a detailed examination of the decomposition components, other than to say the explained and residual percentages were similar to those previously reported.

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[12] Nursing, with its high percentage of females and relatively high salaries, ameliorated both the explained and residual earnings gap. Future work should include some testing for covariance effects between Nursing and Public Sector Employment.

Table 8. Estimated Components of the Female/Male Earnings Gap Among 1982 University Graduates[1] 1984 and 1987

	1984		1987	
	$	%	$	%
Differing Characteristics	1,300	35	2,500	36
Differing Returns to Characteristics				
- Male Advantage	1,000	28	2,300	33
- Female Disadvantage	1,400	37	2,200	31
Total Earnings Gap[2]	3,700	100	7,000	100

1. Employed full-time at all 5 timepoints: January 1983, October 1983, June 1984, January 1986 and March 1987.

2. Difference in the geometric average earnings of males and females.

Table 9. Estimated Components of the Female/Male Earnings Gap Among 1982 Community College Graduates[1] 1984 and 1987

	1984		1987	
	$	%	$	%
Differing Characteristics	800	19	1,200	18
Differing Returns to Characteristics				
- Male Advantage	1,700	40	2,700	39
- Female Disadvantage	1,700	41	3,000	43
Total Earnings Gap[2]	4,200	100	6,900	100

1. Employed full-time at all 5 timepoints: January 1983, October 1983, June 1984, January 1986 and March 1987.

2. Difference in the geometric average earnings of males and females.

Discussion

In summary, this report has focused on the female / male earnings differential of a very select group -- 1982 university and community college graduates who were employed full-time in 1984 or 1987. The earnings gap in this young, well-educated cohort was much smaller than that found in the general working population or workers in the same age range as the graduates. The earnings gap for both groups grew between 1984 and 1987, with the gap for community college graduates being somewhat wider in both years. The earnings differential between male and female graduates within fields of study was generally smaller than the overall gap. For university graduates, the gap shrunk further when measured within degree levels within fields of study (disappearing altogether for Ph.D. holders). Program length was not as important a determining factor among the community college graduates. The earnings gap within industries and occupations was generally larger than when viewed by field of study. Men were more likely than women to enter higher-paying occupations, even when controlling for field of study. Similarly, a higher proportion of male community college graduates entered higher-paying industries. The same tendency could not be found among university graduates. The multivariate model did a better job of accounting for the earnings gap of university graduates. However, even the university model accounted for, at best, one-third of the overall earnings differential. Differing field of study distributions played the biggest role in the 'explained' proportion of the gap.

This quick run-through of findings raises a number of issues. Three of these will receive some attention here. First of all, why is the earnings gap larger among community college graduates than university graduates? As a corollary, why do most of the variables analyzed (and the multivariate model) do a better job of explaining the earnings gap among university graduates? Secondly, would other variables or alternative models offer better explanations of the earnings gap? Finally, is it possible to identify earnings discrimination by gender with surveys such as the NGS and FOG?

The Larger Earnings Gap Among Community College Graduates

In all the analyses presented in this paper, the male / female earnings gap was found to be wider among community college than university graduates. There are two possible explanations for this. The first is that community college graduates tend to enter jobs (or even segments of the labour market) where the earnings gap is actually larger than in the jobs (or segment of the labour market) that university graduates tend to enter. The second, more plausible, explanation involves unmeasured differences in the population under study -- what economists refer to as heterogeneity. To wit, the community college graduates are, in some important respects, a more diverse group than the university graduates. This greater heterogeneity can easily be seen in three important areas: the institutional history and function; entrance and graduation standards; and field of study diversity.

Unlike universities, community colleges have a relatively brief history. While some polytechnical and vocational schools have been around for many

years, most community colleges date back no further than 25 years. They have not had the time to develop the tradition or standards of entry and graduation associated with universities. But even more importantly, community colleges play a much different role than universities. The primary role of community colleges is to provide graduates with the job-related knowledge and skills required in local and regional labour markets. Community college standards of entry and graduation, as well as the courses offered, are then primarily geared to producing specific job skills. The primary role of universities is the transmission and/or development of knowledge, packaged into broadly recognized fields of study and degree levels that are more-or-less substitutable across institutions and regions. The production of job-specific skills is usually incidental to the attainment of a degree.[13] The differing institutional roles dictate a greater diversity in qualifications for entry and graduation and in the courses offered at community colleges.

Community college entrance requirements can range from high school graduation in an academic stream to job-related experience to little or no formal education. University entrance almost always requires a high school diploma in an academic stream and may be further conditioned upon the applicant's marks or scores on standardized tests. The length of community college courses is driven by specific job requirements, while the time required to attain a university degree is fairly rigid across fields of study and institutions. As a consequence of these differences, the university graduates in this study were pre-selected for such unmeasured variables as academic ability or achievement-orientation more so than were the community college graduates.

The less-standardized, broader range of courses offered at community colleges may also help to explain the greater gender earnings gap among their graduates. In essence, female / male differences in courses of study may be taking place in more disaggregated fields than were analyzed in this paper. For example, the community college computer science category encompasses computer operation and data entry courses which lead to relatively low-paying jobs, as well as programming/analysis streams which lead to higher-paying jobs. If women and men are unevenly distributed between these unmeasured sub-fields, the estimated earnings gap can be inflated (or deflated) by comparing respondents with different qualifications. Since university disciplines are, to some extent, regulated by academic associations with degree requirements varying little between similar disciplines, unmeasured stratification by sex should not be as much of a problem.

While the remedies to overcome the greater heterogeneity of community college graduates in analytical studies are fairly obvious, they may not be entirely feasible. Variables are available on the NGS/FOG which could control for previous education and institution (or perhaps province, since community

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[13] While the professions (law, medicine, engineering, etc.) may seem to be obvious exceptions to this generalization, job-specific skills are normally passed along through apprenticeship programs (e.g. articling in law offices or hospital internships) rather than in university classrooms.

colleges are administered at the provincial level). Furthermore, detailed field of study codes provide the means to construct more homogenous groupings. On the other hand, adding the controls and moving to finer field of study detail quickly leads to problems of small sample size and increased variance. Consequently, these remedies may have more application to the multivariate models than to the descriptive statistics.

Model Specification / Omitted Variables

In addressing the issues of model specification and omitted variables, two questions are posed. First, are the proper questions being asked to analyze the subject at hand? And second, are the available data suitable and used to the best advantage to address the issues? Since the descriptive statistics are less contentious, the discussion on model specification will centre on the multivariate analysis. The look at omitted variables will concentrate on those available on or which might be estimated from the NGS and FOG.

While the decomposition methodology has been widely used for a number of years, its use has come under some criticism -- mainly in the interpretation of the residual component of the earnings differential. As was noted in the main body of the paper, the residual component should not be interpreted as direct evidence of discrimination: it is impossible within the scope of the model to distinguish discrimination from self selection or the effect of other unmeasured variables. With some care taken in the vocabulary used to present the results, this should not be a major problem. A much larger problem may be with the way this model approaches the issue of gender earnings differentials.

A recent article (Jackson and Lindley, 1989) points out two major problems with the decomposition technique that had previously received little attention in the literature. First and foremost, earnings decompositions start with the implicit assumption that men and women (or whatever groups are being compared) receive different returns to their human capital investment. Secondly, decomposition treats sample-based coefficients as deterministic, thereby disregarding sampling error and throwing away information that could be used to statistically test the relevant hypotheses. Jackson and Lindley (1989) propose a methodology that allows the assumption of differential returns to modelled variables to be statistically tested, along with the individual and joint significance of the variables in the model. While the details of Jackson and Lindley' model needn't be outlined here, their methodology was tested on the 1987 earnings of the university graduates. This test confirmed that both the residual component of the decomposition and the difference in the male and female intercepts were statistically significant for that group.

Some omitted, yet measured, variables and refinements of currently used variables could also be incorporated into future work. As was mentioned in the discussion on the larger earnings gap found among community college graduates, previous educational attainment is available on the file and may partially account for the larger gap. Further work on refining the fields of study into more homogenous groups could also help.

Some recent research (Finney, 1989) suggests that the quality of the job match (i.e. the qualifications of the candidate matching the requirements of the job) is an important omitted variable in determining the true earnings gap. While Finney estimates this effect with an instrumental variable approach, the NGS and FOG have questions that are directly related to the quality of the job match. These include questions on the education required to carry out the duties of the job and the respondent's satisfaction with the salary level and the job itself. Tests on whether these variables might improve the model could be integrated into future NGS/FOG work.

Is Sex Discrimination Measurable with the NGS/FOG?

If one is forced to respond directly, the answer must be "no". However, the negative response is not directly related to the quality of the surveys. As has been pointed out a number of times throughout this paper, the NGS/FOG is probably the best vehicle available to look at the recent state of the female / male earnings gap in Canada. The combination of a broad range of human capital and background variables, the specificity of the cohort, and the multiple soundings of the labour market experiences cannot be matched in other microdata sources. The problem in identifying discrimination has more to with the forms it takes and its underlying rational.

Sex discrimination can be classified into two basic forms: hiring and advancement selection based on sex; and, differential pay for the same work. Each form of discrimination presents its own problems to researchers. Hiring and advancement selection is based in well-developed theoretical arguments and supported by ample circumstantial evidence in the NGS/FOG. However, employer selection is so functionally and theoretically similar to self-selection (choice) that it is virtually impossible to distinguish the two. On the other hand, unequal pay for the same work does not have strong theoretical support, is probably identifiable only with a case study format and may be difficult to isolate from selection effects.

At the risk of oversimplification, most theoretical discussions of hiring and advancement selection boil down to 'statistical discrimination'.[14] To briefly summarize this argument, women are more likely to interrupt their working careers for marriage and child care than men. Employers prefer 'career-track' employees who do not have short or frequently interrupted careers. Since employers cannot readily determine at the time of hiring which women will have short or interrupted careers, hiring or advancing a man is a better bet, particularly in jobs that require significant on-the-job training and career development, all other considerations being equal. While this type of discrimination has traditionally been illustrated by the shunting of women to 'pink collar ghettos' such as clerical work, it is not necessarily that blunt. There is enough leeway within most highly-qualified occupations for some stratification by sex to occur. But at this level the distinction

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[14] For a longer, more general discussion on statistical discrimination see Thurow (1975).

between discrimination and self-selection is not always clear.

Human capital theory suggests that women who plan to have shorter or interrupted careers would favour jobs that have relatively shorter periods of on-the-job training and offer little penalty for time spent out of the labour force. Trade-offs may exist within most occupations whereby some jobs can be exited and re-entered relatively easily, but with some pay or benefit penalties. The self-selection of different occupational streams reinforces the earnings gap, but is not normally labelled discrimination.

Of course the distinction between discrimination and self-selection is blurred by other factors such as childhood instruction in male and female roles, the expectation of discrimination in some occupations and the individual's imperfect knowledge of their own future. All of which makes it very difficult to clearly identify hiring and advancement discrimination. One possibility available with the NGS/FOG would be to look at gender differentials in job and salary satisfaction, where greater dissatisfaction among one group would provide indirect evidence of hiring or advancement discrimination.[15]

The issue of earnings differentials for essentially the same duties is more difficult to isolate. Regardless of the problems with theoretical arguments, this phenomenon simply cannot be measured with normal survey microdata. There are two main reasons for this. The first involves sampling ratios. Surveys typically sample only a small proportion of the population, therefore making it highly unlikely that men and women with similar qualifications doing similar jobs at the same firm could be identified. Even though the NGS/FOG provide many controls for qualification and experience and have a very low sampling ratio, the jobs held by the graduates represent a minute fraction of all jobs in the labour market. Even if a few matches could be found (from which no statistical inferences could be drawn), the second problem would come into play: occupation coding.

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[15] Among the full-time, employed university graduates in 1987, overall job satisfaction was essentially the same for men and women but a slightly higher percentage of women (22% compared to 19% for men) were dissatisfied with their salaries.

Canadian microdata sources -- NGS/FOG included -- at best contain occupation information coded at the Standard Occupation Classification four-digit level. What this jargon means is that the entire range of jobs in Canada is summarized into less than 500 categories. Obviously jobs within categories cannot be entirely homogenous at this level. If homogenous jobs cannot be identified, then unequal pay for the same job cannot be measured. Furthermore, job titles may be the source of discrimination. It is possible that essentially similar job duties may be given different titles or descriptions for men and women (Baron and Bielby, 1986). Focused case studies may provide some insights, but bring about a different set of problems.

One final point to consider is that the wage gap, particularly among the more homogenous university graduates, is relatively small. Remember that the average earnings of male and female Ph.D.'s in this study were essentially equal. Furthermore, a simple cross-tabulation of two variables -- aggregate field of study and degree level -- produced an average earnings gap of less than 10% among all university graduates. If male and female earnings are converging over time (that is, for subsequent cohorts), isolating and analyzing a wage gap will become increasingly difficult. Joint labour supply decisions and fertility may deserve more attention than a diminishing earnings gap. On the other hand, the NGS/FOG indicate that the within-cohort gap grows somewhat over time. Why the earnings of male and female classmates diverge over time is an important question that should receive more attention in future NGS/FOG studies.

Appendix I. Multivariate Analysis Results

The following tables detail the results of the multivariate analysis that were summarized in the main body of the report. The first table defines the variables used in the regressions, as well as the omitted variable from each group of dummy variables. The remaining four tables outline the decomposition calculations for 1982 community college and university graduates in 1984 and 1987.

The regressions were weighted so that the estimated coefficients are generalizable to the entire population of 1982 graduates (subject to the other restrictions on the population). The weights were adjusted to have a mean of 1.0 so as not to underestimate the standard errors of the coefficients. The standard errors will still be slightly underestimated due to sample design effects (i.e. the sample was stratified by province, level of study and field of study). However, previous tests with far more complicated sample designs indicate that this should not be a significant factor.

Appendix Table I.1
Variable Definitions for Multivariate Analysis

intercep	intercept
age	age
agesq	age squared
english	home language is English (ommitted variable)
french	home language is French
othlang	home language other than French or English
homepr	work province = original province (ommitted variable)
schoolpr	(work province = school province) -= original province
otherpr	work province -= school province -= original province
parentnp	neither parent postsecondary educated (ommitted variable)
parentps	at least one parent had some postsecondary education
single	currently single (ommitted variable)
married	currently married
divsepwi	currently divorced, widowed or separated
nokids	currently has no dependent children (ommitted variable)
kids	currently has dependent children
noprft	no prior full-time experience (ommitted variable)
prftlt1	prior full-time experience: < 1 year
prft1_3	prior full-time experience: 1-3 years
prftgt3	prior full-time experience: 1-3 years
atlantic	currently resides in Atlantic Provinces
quebec	currently resides in Quebec
ontario	currently resides in Ontario (ommitted variable)
mansask	currently resides in Manitoba or Saskatchewan
alberta	currently resides in Alberta
bcterr	currently resides in British Columbia or Territories
pubsect	works in public administration, health, education or welfare
privsect	works in private sector (ommitted variable)

Variables Specific to Community College Graduates

arts	general arts (ommitted variable)
finearts	fine arts
promocom	promotional or commercial arts
graphic	graphic or audio-visual arts
masscomm	mass communications
applarts	applied arts
journlsm	journalism
libsci	library sciences
nursing	nursing
medtech	medical technologists
medequip	medical equipment technologists
othhlth	other health-related programs
chemtech	chemical technologies
elecetc	electrical and electronic technologies
mathcs	math and computer sciences

transprt	transportation technologies
genrleng	general engineering technologies
archcnst	architectual and construction technologies
indsteng	industrial engineering technologies
agric	agriculture
prmryind	primary industry technologies
prcssind	processing industry technologies
envcons	environment and conservation
protcorr	protection and correctional services
socserv	social services
sportrec	sports and recreation
othsocsc	other social sciences
merchsal	merchandising and sales
service	personal services (restaurant, hotel, etc.)
oneyear	course length: 1 year or less
twoyear	course length: 2 years
threeyr	course length: > 2 years (ommitted variable)

Variables Specific to University Graduates

education	education (ommitted variable)
fineart	fine arts
applart	applied arts
journlsm	journalism
othhuman	other humanities
socanthr	sociology and anthropology
crimlgy	criminology
law	law (professional degree)
econonmcs	economics
geoenvr	geography and environmental studies
polisci	political science
psych	psychology
othsocsc	other social sciences
agric	agriculture
bioetc	biology, biochemistry, zoology
homeec	home economics
veternry	veterinary
archtct	architecture
engineer	engineering
forestry	forestry
dentist	dentistry
medicine	medical degree
nursing	nursing
optomtry	optometry
pharmacy	pharmacy
pubhlth	public health
othhlth	other health-related degrees
compsci	computer sciences
math	math, statistics
chemetc	chemistry, geology and metallurgy

metrlogy	meteorology
physetc	physics and other sciences
undergrd	undergraduate degree (ommitted variable)
masters	earned masters degree
doctorat	earned doctorate degree

Appendix Table I.2
Decomposition Calculations for Community College Graduates, 1984
Full-time at All Timepoints

Males

mean log earnings	9.958798
geometric mean earnings	21137
N	1823
adjusted r-squared	0.17

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.2144	0.1372	67.1821
age	25.2047	0.0354	0.0079	4.5123
agesq	652.723	-0.0003	0.0001	-3.0566
french	0.2372	-0.0242	0.0415	-0.5827
othlang	0.0347	-0.0312	0.0405	-0.7699
schoolpr	0.0277	-0.0491	0.0466	-1.0549
otherpr	0.0505	0.0319	0.0353	0.9062
parentps	0.2844	0.0435	0.0166	2.6244
married	0.3402	0.0275	0.0172	1.6021
divsepwi	0.0043	-0.1030	0.1131	-0.9101
kids87	0.0905	0.0044	0.0305	0.1448
finearts	0.0052	0.0200	0.1020	0.1960
promocom	0.0060	-0.2450	0.0953	-2.5711
graphic	0.0260	-0.0834	0.0485	-1.7181
masscomm	0.0141	-0.1039	0.0636	-1.6335
applarts	0.0092	-0.1930	0.0777	-2.4839
journlsm	0.0044	-0.1896	0.1101	-1.7221
libsci	0.0038	-0.1522	0.1206	-1.2627
nursing	0.0228	0.0395	0.0534	0.7407
medtech	0.0343	0.2365	0.0458	5.1634
medequip	0.0017	-0.0751	0.1839	-0.4086
othhlth	0.0017	0.1406	0.1767	0.7962
chemtech	0.0187	0.1397	0.0558	2.5026
elecetc	0.1775	0.0832	0.0249	3.3440
mathcs	0.0712	0.0795	0.0325	2.4452
transprt	0.0101	0.1058	0.0746	1.4176
genrleng	0.1298	0.0628	0.0270	2.3270
archcnst	0.0596	-0.0360	0.0347	-1.0354
indsteng	0.0291	0.0332	0.0465	0.7135
agric	0.0287	-0.0502	0.0469	-1.0690
prmryind	0.0185	0.1170	0.0567	2.0639
prcssind	0.0130	0.0800	0.0665	1.2044
envcons	0.0114	-0.0845	0.0705	-1.1975
protcorr	0.0428	0.1627	0.0414	3.9350
socserv	0.0136	-0.0141	0.0671	-0.2098
sportrec	0.0084	0.1498	0.0815	1.8381
othsocsc	0.0103	-0.0484	0.0756	-0.6406
merchsal	0.0466	0.0237	0.0380	0.6252
service	0.0135	-0.1075	0.0652	-1.6489

oneyear	0.0993	-0.1207	0.0294	-4.1045
twoyear	0.4729	-0.0889	0.0200	-4.4480
prftlt1	0.0924	0.0201	0.0264	0.7586
prft1_3	0.1672	-0.0069	0.0220	-0.3131
prftgt3	0.1778	0.0332	0.0299	1.1119
atlantic	0.0421	-0.0552	0.0386	-1.4278
quebec	0.2293	-0.0295	0.0428	-0.6905
mansask	0.0499	0.0795	0.0361	2.2039
alberta	0.1313	0.1504	0.0252	5.9594
bcterr	0.0669	0.0741	0.0320	2.3157
pubsect	0.2274	0.0907	0.0209	4.3314

Females

mean log earnings	9.736231
geometric mean earnings	16920
N	1854
adjusted r-squared	0.38

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.0934	0.1286	70.6859
age	24.6230	0.0330	0.0076	4.3560
agesq	637.243	-0.0004	0.0001	-4.4963
french	0.2339	-0.0112	0.0308	-0.3645
othlang	0.0265	-0.0655	0.0400	-1.6382
schoolpr	0.0192	0.0564	0.0461	1.2225
otherpr	0.0404	0.0039	0.0330	0.1196
parentps	0.3144	0.0201	0.0137	1.4659
married	0.2428	0.0181	0.0154	1.1795
divsepwi	0.0222	0.0148	0.0484	0.3061
kids84	0.0621	-0.0479	0.0337	-1.4199
finearts	0.0049	-0.2100	0.0894	-2.3476
promocom	0.0118	-0.2491	0.0588	-4.2401
graphic	0.0091	0.1132	0.0661	1.7138
masscomm	0.0071	-0.1156	0.0749	-1.5448
applarts	0.0208	0.0017	0.0448	0.0380
journlsm	0.0027	0.2680	0.1204	2.2267
libsci	0.0131	-0.0843	0.0567	-1.4869
nursing	0.1681	0.2485	0.0241	10.3045
medtech	0.0762	0.1536	0.0287	5.3468
medequip	0.0013	-0.0147	0.1705	-0.0864
othhlth	0.0066	-0.0098	0.0781	-0.1260
chemtech	0.0101	0.1389	0.0629	2.2094
elecetc	0.0079	0.2704	0.0714	3.7861
mathcs	0.0470	0.2503	0.0307	8.1525
transprt	0.0016	0.0372	0.1559	0.2387
genrleng	0.0079	0.0929	0.0711	1.3058
archcnst	0.0101	0.0434	0.0631	0.6884
indsteng	0.0032	0.2516	0.1115	2.2561
agric	0.0136	-0.1893	0.0542	-3.4928

prmryind	0.0020	0.4383	0.1412	3.1030
prcssind	0.0029	0.0998	0.1169	0.8536
envcons	0.0017	-0.0867	0.1510	-0.5742
protcorr	0.0089	0.2689	0.0669	4.0196
socserv	0.0452	-0.0347	0.0333	-1.0436
sportrec	0.0296	-0.0739	0.0381	-1.9400
othsocsc	0.0701	-0.2091	0.0281	-7.4520
merchsal	0.0301	-0.0509	0.0379	-1.3423
service	0.0117	-0.1183	0.0582	-2.0336
oneyear	0.1517	-0.1754	0.0237	-7.4078
twoyear	0.5601	-0.0521	0.0176	-2.9663
prftlt1	0.0646	0.0164	0.0264	0.6209
prft1_3	0.1104	0.0530	0.0220	2.4086
prftgt3	0.1164	0.1079	0.0312	3.4636
atlantic	0.0541	-0.0781	0.0297	-2.6332
quebec	0.2322	-0.0611	0.0322	-1.8973
mansask	0.0520	0.0282	0.0304	0.9289
alberta	0.1267	0.0830	0.0212	3.9241
bcterr	0.0619	0.0685	0.0276	2.4852
pubsect	0.5124	0.1601	0.0177	9.0581

proportion male	0.4740
proportion female	0.5260

	B*	characteristic difference	male advantage	female disadvantage
intercep	9.1507	0.0000	0.0636	0.0574
age	0.0341	0.0199	0.0326	0.0287
agesq	-0.0004	-0.0056	0.0387	0.0340
french	-0.0174	-0.0001	-0.0016	-0.0014
othlang	-0.0492	-0.0004	0.0006	0.0004
schoolpr	0.0064	0.0001	-0.0015	-0.0010
otherpr	0.0172	0.0002	0.0007	0.0005
parentps	0.0312	-0.0009	0.0035	0.0035
married	0.0226	0.0022	0.0017	0.0011
divsepwi	-0.0410	0.0007	-0.0003	-0.0012
kids84	-0.0231	-0.0007	0.0025	0.0015
finearts	-0.1010	-0.0000	0.0006	0.0005
promocom	-0.2472	0.0014	0.0000	0.0000
graphic	0.0200	0.0003	-0.0027	-0.0009
masscomm	-0.1101	-0.0008	0.0001	0.0000
applarts	-0.0906	0.0011	-0.0009	-0.0019
journlsm	0.0511	0.0001	-0.0011	-0.0006
libsci	-0.1165	0.0011	-0.0001	-0.0004
nursing	0.1494	-0.0217	-0.0025	-0.0167
medtech	0.1929	-0.0081	0.0015	0.0030
medequip	-0.0434	-0.0000	-0.0001	-0.0000
othhlth	0.0615	-0.0003	0.0001	0.0005
chemtech	0.1393	0.0012	0.0000	0.0000
elecetc	0.1817	0.0308	-0.0175	-0.0007

mathcs	0.1694	0.0041	-0.0064	-0.0038
transprt	0.0697	0.0006	0.0004	0.0001
genrleng	0.0786	0.0096	-0.0021	-0.0001
archcnst	0.0058	0.0003	-0.0025	-0.0004
indsteng	0.1481	0.0038	-0.0033	-0.0003
agric	-0.1234	-0.0019	0.0021	0.0009
prmryind	0.2860	0.0047	-0.0031	-0.0003
prcssind	0.0904	0.0009	-0.0001	-0.0000
envcons	-0.0856	-0.0008	0.0000	0.0000
protcorr	0.2186	0.0074	-0.0024	-0.0004
socserv	-0.0249	0.0008	0.0001	0.0004
sportrec	0.0321	-0.0007	0.0010	0.0031
othsocsc	-0.1329	0.0080	0.0009	0.0053
merchsal	-0.0155	-0.0003	0.0018	0.0011
service	-0.1132	-0.0002	0.0001	0.0001
oneyear	-0.1495	0.0078	0.0029	0.0039
twoyear	-0.0696	0.0061	-0.0092	-0.0098
prftlt1	0.0181	0.0005	0.0002	0.0001
prft1_3	0.0246	0.0014	-0.0053	-0.0031
prftgt3	0.0725	0.0044	-0.0070	-0.0041
atlantic	-0.0672	0.0008	0.0005	0.0006
quebec	-0.0461	0.0001	0.0038	0.0035
mansask	0.0525	-0.0001	0.0013	0.0013
alberta	0.1150	0.0005	0.0047	0.0040
bcterr	0.0711	0.0004	0.0002	0.0002
pubsect	0.1272	-0.0362	-0.0083	-0.0169
	total	0.0426	0.0883	0.0917	0.2226
	percentage	19.13%	39.68%	41.19%	100.00%
	dollar value	807	1673	1737	4218

Appendix Table I.3
Decomposition Calculations for Community College Graduates, 1987
Full-time at All Timepoints

Males

mean log earnings	10.29106
geometric mean earnings	29468
N	1820
adjusted r-squared	0.08

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.9586	0.1566	63.6049
age	28.1896	0.0168	0.0081	2.0798
agesq	813.411	-0.0002	0.0001	-1.6992
french	0.2290	-0.0205	0.0420	-0.4880
othlang	0.0333	-0.0900	0.0430	-2.0964
schoolpr	0.0241	0.0094	0.0520	0.1802
otherpr	0.0669	0.0210	0.0320	0.6556
parentps	0.2929	0.0297	0.0171	1.7379
married	0.5764	0.0342	0.0183	1.8638
divsepwi	0.0257	-0.0382	0.0506	-0.7551
kids87	0.2776	0.0343	0.0204	1.6817
finearts	0.0062	0.0026	0.0974	0.0268
promocom	0.0079	-0.0283	0.0868	-0.3266
graphic	0.0261	-0.1049	0.0504	-2.0798
masscomm	0.0117	-0.0753	0.0722	-1.0430
applarts	0.0085	-0.1688	0.0839	-2.0128
journlsm	0.0044	-0.2857	0.1145	-2.4956
libsci	0.0038	-0.2082	0.1256	-1.6573
nursing	0.0247	0.0618	0.0537	1.1520
medtech	0.0344	0.1803	0.0474	3.8007
medequip	0.0017	-0.3907	0.1920	-2.0354
othhlth	0.0017	0.1301	0.1844	0.7055
chemtech	0.0188	0.0481	0.0582	0.8269
elecetc	0.1805	0.0468	0.0258	1.8184
mathcs	0.0712	0.1179	0.0337	3.4934
transprt	0.0106	0.2119	0.0760	2.7899
genrleng	0.1298	0.0222	0.0280	0.7929
archcnst	0.0566	-0.0142	0.0369	-0.3854
indsteng	0.0275	0.0917	0.0495	1.8530
agric	0.0285	-0.1198	0.0491	-2.4427
prmryind	0.0185	0.0646	0.0589	1.0957
prcssind	0.0126	-0.0234	0.0703	-0.3324
envcons	0.0122	-0.1326	0.0710	-1.8666
protcorr	0.0428	0.2107	0.0435	4.8391
socserv	0.0119	-0.0024	0.0737	-0.0328
sportrec	0.0071	0.1824	0.0921	1.9809
othsocsc	0.0120	0.0404	0.0726	0.5562
merchsal	0.0446	0.1200	0.0401	2.9904
service	0.0155	-0.1648	0.0635	-2.5949

oneyear	0.0989	-0.0717	0.0309	-2.3197
twoyear	0.4801	-0.0628	0.0207	-3.0339
prftlt1	0.0921	-0.0221	0.0275	-0.8055
prft1_3	0.1710	-0.0383	0.0226	-1.6913
prftgt3	0.1738	-0.0050	0.0310	-0.1624
atlantic	0.0436	-0.1343	0.0399	-3.3681
quebec	0.2234	-0.1296	0.0429	-3.0214
mansask	0.0466	-0.0169	0.0384	-0.4404
alberta	0.1380	0.0453	0.0258	1.7548
bcterr	0.0668	0.0027	0.0332	0.0812
pubsect	0.2281	-0.0185	0.0216	-0.8584

Females

mean log earnings	10.02221
geometric mean earnings	22521
N	1872
adjusted r-squared	0.31

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.7653	0.1086	89.8889
age	27.5652	0.0110	0.0056	1.9707
agesq	790.592	-0.0001	0.0001	-1.5983
french	0.2213	-0.0188	0.0298	-0.6289
othlang	0.0244	-0.0518	0.0405	-1.2797
schoolpr	0.0180	0.0818	0.0464	1.7624
otherpr	0.0564	0.0134	0.0276	0.4840
parentps	0.3222	-0.0206	0.0133	-1.5515
married	0.5307	0.0153	0.0132	1.1556
divsepwi	0.0357	0.0278	0.0362	0.7687
kids87	0.1765	-0.0494	0.0179	-2.7512
finearts	0.0052	0.0749	0.0851	0.8804
promocom	0.0112	-0.0541	0.0591	-0.9143
graphic	0.0099	0.0351	0.0619	0.5667
masscomm	0.0062	-0.0393	0.0782	-0.5033
applarts	0.0220	0.0260	0.0428	0.6071
journlsm	0.0027	0.2750	0.1183	2.3249
libsci	0.0122	-0.0881	0.0571	-1.5433
nursing	0.1729	0.2058	0.0232	8.8831
medtech	0.0798	0.2123	0.0273	7.7827
medequip	0.0013	0.3050	0.1674	1.8213
othhlth	0.0065	-0.4799	0.0762	-6.2969
chemtech	0.0105	0.1246	0.0601	2.0744
elecetc	0.0067	0.2639	0.0750	3.5197
mathcs	0.0471	0.2547	0.0300	8.4843
transprt	0.0016	-0.0767	0.1531	-0.5009
genrleng	0.0069	0.1325	0.0746	1.7760
archcnst	0.0102	0.0301	0.0613	0.4907
indsteng	0.0031	0.2381	0.1094	2.1775

agric	0.0135	-0.1666	0.0532	-3.1289
prmryind	0.0020	0.2438	0.1386	1.7598
prcssind	0.0028	-0.0101	0.1148	-0.0876
envcons	0.0015	-0.1566	0.1569	-0.9982
protcorr	0.0080	0.2905	0.0688	4.2211
socserv	0.0433	-0.0613	0.0328	-1.8707
sportrec	0.0284	-0.1000	0.0379	-2.6389
othsocsc	0.0728	-0.1997	0.0271	-7.3801
merchsal	0.0288	0.0705	0.0377	1.8693
service	0.0124	-0.1707	0.0555	-3.0760
oneyear	0.1511	-0.1816	0.0232	-7.8129
twoyear	0.5662	-0.0563	0.0172	-3.2707
prftlt1	0.0670	0.0572	0.0252	2.2717
prft1_3	0.1127	0.0583	0.0212	2.7493
prftgt3	0.1158	0.1378	0.0298	4.6267
atlantic	0.0535	-0.1235	0.0291	-4.2436
quebec	0.2172	-0.0839	0.0316	-2.6529
mansask	0.0479	-0.0075	0.0306	-0.2448
alberta	0.1277	0.0314	0.0203	1.5443
bcterr	0.0660	-0.0116	0.0263	-0.4425
pubsect	0.5203	0.0895	0.0170	5.2695
proportion male	0.4710			
proportion female	0.5290			

	B*	characteristic difference	male advantage	female disadvantage
intercep	9.8564	0.0000	0.1023	0.0911
age	0.0137	0.0086	0.0872	0.0759
agesq	-0.0001	-0.0028	-0.0262	-0.0226
french	-0.0196	-0.0002	-0.0002	-0.0002
othlang	-0.0698	-0.0006	-0.0007	-0.0004
schoolpr	0.0477	0.0003	-0.0009	-0.0006
otherpr	0.0170	0.0002	0.0003	0.0002
parentps	0.0031	-0.0001	0.0078	0.0076
married	0.0242	0.0011	0.0057	0.0047
divsepwi	-0.0033	0.0000	-0.0009	-0.0011
kids87	-0.0100	-0.0010	0.0123	0.0070
finearts	0.0409	0.0000	-0.0002	-0.0002
promocom	-0.0420	0.0001	0.0001	0.0001
graphic	-0.0309	-0.0005	-0.0019	-0.0007
masscomm	-0.0563	-0.0003	-0.0002	-0.0001
applarts	-0.0658	0.0009	-0.0009	-0.0020
journlsm	0.0109	0.0000	-0.0013	-0.0007
libsci	-0.1446	0.0012	-0.0002	-0.0007
nursing	0.1380	-0.0204	-0.0019	-0.0117
medtech	0.1973	-0.0089	-0.0006	-0.0012
medequip	-0.0227	-0.0000	-0.0006	-0.0004
othhlth	-0.1926	0.0009	0.0006	0.0019
chemtech	0.0886	0.0007	-0.0008	-0.0004
elecetc	0.1616	0.0281	-0.0207	-0.0007

mathcs	0.1902	0.0046	-0.0052	-0.0030	
transprt	0.0593	0.0005	0.0016	0.0002	
genrleng	0.0805	0.0099	-0.0076	-0.0004	
archcnst	0.0092	0.0004	-0.0013	-0.0002	
indsteng	0.1692	0.0041	-0.0021	-0.0002	
agric	-0.1446	-0.0022	0.0007	0.0003	
prmryind	0.1594	0.0026	-0.0018	-0.0002	
prcssind	-0.0163	-0.0002	-0.0001	-0.0000	
envcons	-0.1453	-0.0015	0.0002	0.0000	
protcorr	0.2529	0.0088	-0.0018	-0.0003	
socserv	-0.0336	0.0011	0.0004	0.0012	
sportrec	0.0330	-0.0007	0.0011	0.0038	
othsocsc	-0.0866	0.0053	0.0015	0.0082	
merchsal	0.0938	0.0015	0.0012	0.0007	
service	-0.1679	-0.0005	0.0000	0.0000	
oneyear	-0.1298	0.0068	0.0057	0.0078	
twoyear	-0.0594	0.0051	-0.0017	-0.0017	
prftlt1	0.0198	0.0005	-0.0039	-0.0025	
prft1_3	0.0128	0.0007	-0.0087	-0.0051	
prftgt3	0.0705	0.0041	-0.0131	-0.0078	
atlantic	-0.1286	0.0013	-0.0002	-0.0003	
quebec	-0.1054	-0.0006	-0.0054	-0.0047	
mansask	-0.0119	0.0000	-0.0002	-0.0002	
alberta	0.0379	0.0004	0.0010	0.0008	
bcterr	-0.0049	-0.0000	0.0005	0.0004	
pubsect	0.0386	-0.0113	-0.0130	-0.0265	
	total	0.0480	0.1057	0.1151	0.2688
	percentage	17.85%	39.32%	42.83%	100.00%
	dollar value	1240	2732	2975	6947

Appendix Table I.4
Decomposition Calculations for University Graduates, 1984
Full-time at All Timepoints

Males

mean log earnings	10.2547
geometric mean earnings	28415
N	3544
adjusted r-squared	0.35

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.1451	0.0890	102.7068
age	29.7651	0.0446	0.0047	9.5937
agesq	929.899	-0.0004	0.0001	-7.0391
french	0.2400	0.0080	0.0192	0.4170
othlang	0.0329	-0.1362	0.0289	-4.7064
schoolpr	0.0358	-0.0285	0.0272	-1.0460
otherpr	0.1126	0.0452	0.0166	2.7253
parentps	0.3500	-0.0260	0.0107	-2.4420
married	0.4982	0.0473	0.0121	3.9078
divsepwi	0.0098	0.0381	0.0519	0.7350
kids87	0.2954	0.0352	0.0148	2.3733
fineart	0.0091	-0.1146	0.0536	-2.1382
applart	0.0018	0.0086	0.1189	0.0720
journlsm	0.0012	0.2922	0.1418	2.0610
othhuman	0.0564	-0.1485	0.0247	-6.0216
socanthr	0.0167	-0.1421	0.0406	-3.5045
crimlgy	0.0014	0.0493	0.1322	0.3725
law	0.0287	0.1051	0.0336	3.1289
econonmcs	0.0441	0.1084	0.0284	3.8242
geoenvr	0.0263	0.0271	0.0332	0.8143
polisci	0.0135	0.0927	0.0446	2.0794
psych	0.2635	0.0625	0.0180	3.4668
othsocsc	0.0113	-0.1170	0.0481	-2.4310
agric	0.0159	-0.0845	0.0426	-1.9866
bioetc	0.0154	-0.0213	0.0424	-0.5035
homeec	0.0016	-0.2591	0.1267	-2.0439
veternry	0.0033	0.0092	0.0871	0.1056
archtct	0.0094	-0.0458	0.0538	-0.8516
engineer	0.1533	0.1780	0.0207	8.5916
forestry	0.0105	-0.0937	0.0511	-1.8339
dentist	0.0139	0.8716	0.0444	19.6396
medicine	0.0286	0.2266	0.0327	6.9204
nursing	0.0009	-0.0609	0.1689	-0.3605
optomtry	0.0021	0.5518	0.1082	5.0987
pharmacy	0.0069	0.2492	0.0620	4.0170
pubhlth	0.0015	0.4031	0.1277	3.1577
othhlth	0.0023	0.0991	0.1033	0.9586
compsci	0.0472	0.1721	0.0277	6.2091

math	0.0195	0.0905	0.0388	2.3358
chemetc	0.0128	0.1393	0.0467	2.9831
metrlogy	0.0007	-0.0087	0.1823	-0.0479
physetc	0.0061	0.1087	0.0651	1.6689
masters	0.1966	0.1705	0.0141	12.0546
doctorat	0.0194	0.0958	0.0377	2.5379
prftlt1	0.0707	-0.0348	0.0203	-1.7150
prft1_3	0.1367	-0.0521	0.0162	-3.2208
prftgt3	0.3136	0.0215	0.0194	1.1111
atlantic	0.0758	-0.0792	0.0201	-3.9361
quebec	0.2806	-0.0305	0.0190	-1.5996
mansask	0.0765	0.0005	0.0201	0.0261
alberta	0.1159	0.0615	0.0174	3.5332
bcterr	0.0723	-0.0043	0.0205	-0.2082
pubserv	0.4283	0.0049	0.0135	0.3678

Females

mean log earnings	10.11517
geometric mean earnings	24715
N	2393
adjusted r-squared	0.43

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.1047	0.0757	120.2846
age	30.8317	0.0362	0.0040	8.9719
agesq	1022.759	-0.0003	0.0000	-6.9797
french	0.2415	0.0469	0.0203	2.3165
othlang	0.0261	0.0087	0.0350	0.2482
schoolpr	0.0321	-0.0055	0.0312	-0.1755
otherpr	0.0757	0.0471	0.0215	2.1922
parentps	0.4028	-0.0158	0.0113	-1.3996
married	0.3917	0.0072	0.0127	0.5689
divsepwi	0.0489	-0.0394	0.0276	-1.4243
kids87	0.2136	-0.0169	0.0172	-0.9819
fineart	0.0123	-0.1434	0.0499	-2.8731
applart	0.0061	-0.1559	0.0702	-2.2205
journlsm	0.0104	-0.0032	0.0561	-0.0571
othhuman	0.1149	-0.0950	0.0199	-4.7809
socanthr	0.0397	-0.0249	0.0298	-0.8354
crimlgy	0.0021	-0.0890	0.1179	-0.7549
law	0.0163	0.1064	0.0459	2.3179
econonmcs	0.0196	0.1015	0.0418	2.4281
geoenvr	0.0164	-0.2214	0.0444	-4.9907
polisci	0.0172	-0.0101	0.0431	-0.2339
psych	0.1987	0.0621	0.0177	3.4993
othsocsc	0.0380	-0.0843	0.0296	-2.8443
agric	0.0081	0.1551	0.0612	2.5343
bioetc	0.0150	-0.0523	0.0458	-1.1418
homeec	0.0094	-0.1369	0.0568	-2.4118

veternry	0.0024	-0.0313	0.1107	-0.2824
archtct	0.0007	0.1894	0.1971	0.9611
engineer	0.0144	0.3142	0.0472	6.6572
forestry	0.0042	0.0345	0.0846	0.4080
dentist	0.0020	0.5290	0.1203	4.3981
medicine	0.0244	0.1049	0.0363	2.8926
nursing	0.0532	0.0892	0.0257	3.4775
optomtry	0.0035	0.3031	0.0922	3.2872
pharmacy	0.0162	0.3968	0.0450	8.8106
pubhlth	0.0026	0.2029	0.1063	1.9088
othhlth	0.0330	0.0561	0.0318	1.7648
compsci	0.0133	0.2906	0.0490	5.9285
math	0.0145	0.2538	0.0476	5.3331
chemetc	0.0104	0.0587	0.0551	1.0659
metrlogy	0.0002	-0.0944	0.3961	-0.2383
physetc	0.0006	0.2466	0.2166	1.1384
masters	0.1265	0.1655	0.0170	9.7098
doctorat	0.0089	0.1397	0.0581	2.4030
prftlt1	0.0569	0.0762	0.0246	3.0992
prft1_3	0.1072	-0.0091	0.0192	-0.4723
prftgt3	0.3685	0.1247	0.0213	5.8684
atlantic	0.0834	-0.0841	0.0210	-4.0011
quebec	0.2640	-0.0548	0.0204	-2.6881
mansask	0.0836	0.0321	0.0211	1.5217
alberta	0.1026	0.0412	0.0199	2.0703
bcterr	0.0644	-0.0370	0.0236	-1.5687
pubserv	0.6572	0.1849	0.0152	12.1741

proportion male	0.5497
proportion female	0.4514

	B*	characteristic difference	male advantage	female disadvantage
intercep	9.1370	0.0000	0.0081	0.0323
age	0.0409	-0.0436	0.1118	0.1441
agesq	-0.0003	0.0318	-0.0271	-0.0371
french	0.0256	-0.0000	-0.0042	-0.0052
othlang	-0.0709	-0.0005	-0.0021	-0.0021
schoolpr	-0.0181	-0.0001	-0.0004	-0.0004
otherpr	0.0461	0.0017	-0.0001	-0.0001
parentps	-0.0214	0.0011	-0.0016	-0.0023
married	0.0293	0.0031	0.0090	0.0086
divsepwi	0.0032	-0.0001	0.0003	0.0021
kids87	0.0117	0.0010	0.0069	0.0061
fineart	-0.1278	0.0004	0.0001	0.0002
applart	-0.0657	0.0003	0.0001	0.0006
journlsm	0.1592	-0.0015	0.0002	0.0017
othhuman	-0.1245	0.0073	-0.0014	-0.0034
socanthr	-0.0893	0.0021	-0.0009	-0.0026
crimlgy	-0.0131	0.0000	0.0001	0.0002

law	0.1058	0.0013	-0.0000	-0.0000	
econonmcs	0.1054	0.0026	0.0001	0.0001	
geoenvr	-0.0851	-0.0008	0.0029	0.0022	
polisci	0.0464	-0.0002	0.0006	0.0010	
psych	0.0624	0.0040	0.0000	0.0001	
othsocsc	-0.1024	0.0027	-0.0002	-0.0007	
agric	0.0235	0.0002	-0.0017	-0.0011	
bioetc	-0.0353	-0.0000	0.0002	0.0003	
homeec	-0.2042	0.0016	-0.0001	-0.0006	
veternry	-0.0091	-0.0000	0.0001	0.0001	
archtct	0.0603	0.0005	-0.0010	-0.0001	
engineer	0.2397	0.0333	-0.0095	-0.0011	
forestry	-0.0359	-0.0002	-0.0006	-0.0003	
dentist	0.7179	0.0085	0.0021	0.0004	
medicine	0.1719	0.0007	0.0016	0.0016	
nursing	0.0068	-0.0004	-0.0001	-0.0044	
optomtry	0.4401	-0.0006	0.0002	0.0005	
pharmacy	0.3161	-0.0029	-0.0005	-0.0013	
pubhlth	0.3132	-0.0003	0.0001	0.0003	
othhlth	0.0798	-0.0024	0.0000	0.0008	
compsci	0.2258	0.0077	-0.0025	-0.0009	
math	0.1643	0.0008	-0.0014	-0.0013	
chemetc	0.1030	0.0002	0.0005	0.0005	
metrlogy	-0.0474	-0.0000	0.0000	0.0000	
physetc	0.1711	0.0009	-0.0004	-0.0000	
masters	0.1684	0.0118	0.0004	0.0004	
doctorat	0.1157	0.0012	-0.0004	-0.0002	
prftlt1	0.0152	0.0002	-0.0035	-0.0035	
prft1_3	-0.0327	-0.0010	-0.0026	-0.0025	
prftgt3	0.0681	-0.0037	-0.0146	-0.0208	
atlantic	-0.0815	0.0006	0.0002	0.0002	
quebec	-0.0415	-0.0007	0.0031	0.0035	
mansask	0.0148	-0.0001	-0.0011	-0.0015	
alberta	0.0524	0.0007	0.0011	0.0011	
bcterr	-0.0191	-0.0002	0.0011	0.0012	
pubserv	0.0862	-0.0197	-0.0348	-0.0649	
		0.0493	0.0384	0.0518	0.1395
	percentage	35.37%	27.52%	37.11%	100.00%
	dollar value	1309	1018	1373	3700

Appendix Table I.5
Decomposition Calculations for University Graduates, 1987
Full-time at All Timepoints

Males

mean log earnings	10.5708
geometric mean earnings	38980
N	3562
adjusted r-squared	0.30

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.9104	0.0975	101.6686
age	32.7892	0.0248	0.0046	5.3972
agesq	1121.211	-0.0002	0.0000	-4.4032
french	0.2285	-0.0033	0.0198	-0.1686
othlang	0.0309	-0.0624	0.0300	-2.0796
schoolpr	0.0320	-0.0038	0.0289	-0.1300
otherpr	0.1316	0.0236	0.0156	1.5130
parentps	0.3567	-0.0198	0.0107	-1.8523
married	0.6844	0.0434	0.0133	3.2517
divsepwi	0.0319	-0.0026	0.0309	-0.0851
kids87	0.4232	0.0334	0.0128	2.6179
fineart	0.0080	-0.1512	0.0572	-2.6428
applart	0.0029	0.1055	0.0948	1.1125
journlsm	0.0013	0.0452	0.1435	0.3148
othhuman	0.0573	-0.1376	0.0247	-5.5604
socanthr	0.0157	-0.0999	0.0421	-2.3735
crimlgy	0.0014	-0.0164	0.1318	-0.1247
law	0.0274	0.2218	0.0344	6.4465
econonmcs	0.0423	0.1412	0.0288	4.9094
geoenvr	0.0277	0.0295	0.0328	0.8989
polisci	0.0158	0.2246	0.0420	5.3483
psych	0.2584	0.0714	0.0181	3.9443
othsocsc	0.0113	-0.1012	0.0485	-2.0850
agric	0.0167	-0.0672	0.0418	-1.6063
bioetc	0.0147	-0.0231	0.0436	-0.5289
homeec	0.0016	-0.3094	0.1268	-2.4405
veternry	0.0040	0.0638	0.0802	0.7963
archtct	0.0096	-0.0413	0.0538	-0.7675
engineer	0.1575	0.1083	0.0207	5.2273
forestry	0.0111	-0.1163	0.0501	-2.3231
dentist	0.0127	1.1362	0.0466	24.3865
medicine	0.0293	0.4554	0.0328	13.8859
nursing	0.0009	-0.0673	0.1689	-0.3985
optomtry	0.0018	1.2696	0.1201	10.5672
pharmacy	0.0072	0.1207	0.0611	1.9753
pubhlth	0.0018	0.4549	0.1187	3.8335
othhlth	0.0021	0.0984	0.1092	0.9012
compsci	0.0469	0.1160	0.0281	4.1358

math	0.0204	0.0445	0.0382	1.1635
chemetc	0.0133	0.0772	0.0462	1.6716
metrlogy	0.0007	0.0627	0.1823	0.3442
physetc	0.0059	-0.0051	0.0672	-0.0753
masters	0.2430	0.1234	0.0130	9.4554
doctorat	0.0240	0.1115	0.0344	3.2388
prftlt1	0.0716	-0.0004	0.0204	-0.0189
prft1_3	0.1375	-0.0417	0.0162	-2.5702
prftgt3	0.3134	0.0639	0.0193	3.3095
atlantic	0.0749	-0.1225	0.0203	-6.0398
quebec	0.2658	-0.0798	0.0197	-4.0491
mansask	0.0804	-0.0935	0.0198	-4.7226
alberta	0.1158	-0.0156	0.0174	-0.8995
bcterr	0.0743	-0.0370	0.0204	-1.8134
pubserv	0.4233	-0.0935	0.0134	-6.9599

Females

mean log earnings	10.37205
geometric mean earnings	31954
N	2388
adjusted r-squared	0.29

	mean	parameter estimate	standard error	't' score
intercep	1.0000	9.5550	0.0818	116.7890
age	33.9589	0.0288	0.0039	7.4412
agesq	1231.057	-0.0002	0.0000	-6.0514
french	0.2342	0.0865	0.0216	4.0084
othlang	0.0258	0.0811	0.0362	2.2415
schoolpr	0.0311	-0.0175	0.0325	-0.5384
otherpr	0.0982	0.0433	0.0194	2.2249
parentps	0.4002	-0.0091	0.0117	-0.7807
married	0.5651	0.0464	0.0133	3.4931
divsepwi	0.0730	-0.0027	0.0242	-0.1123
kids87	0.2769	-0.0054	0.0148	-0.3647
fineart	0.0133	-0.1458	0.0497	-2.9351
applart	0.0045	-0.0707	0.0838	-0.8434
journlsm	0.0105	0.0397	0.0578	0.6877
othhuman	0.1120	-0.0850	0.0205	-4.1544
socanthr	0.0393	-0.0531	0.0307	-1.7280
crimlgy	0.0017	-0.0504	0.1356	-0.3714
law	0.0175	0.1526	0.0459	3.3279
econonmcs	0.0209	0.0088	0.0421	0.2098
geoenvr	0.0149	-0.1153	0.0479	-2.4091
polisci	0.0160	0.0514	0.0456	1.1278
psych	0.1978	0.0692	0.0186	3.7252
othsocsc	0.0403	-0.0663	0.0299	-2.2132
agric	0.0078	0.0013	0.0644	0.0207
bioetc	0.0160	-0.0669	0.0459	-1.4568
homeec	0.0093	-0.1987	0.0589	-3.3730

veternry	0.0020	0.1164	0.1235	0.9426
archtct	0.0008	-0.0377	0.2026	-0.1861
engineer	0.0156	0.2551	0.0470	5.4321
forestry	0.0034	0.0004	0.0968	0.0046
dentist	0.0020	0.4756	0.1236	3.8479
medicine	0.0206	0.3630	0.0404	8.9798
nursing	0.0549	0.0234	0.0261	0.8955
optomtry	0.0028	0.8028	0.1051	7.6383
pharmacy	0.0166	0.2697	0.0459	5.8781
pubhlth	0.0026	0.1004	0.1102	0.9112
othhlth	0.0317	0.0345	0.0333	1.0358
compsci	0.0130	0.1951	0.0508	3.8399
math	0.0150	0.2153	0.0483	4.4595
chemetc	0.0105	0.0896	0.0565	1.5843
metrlogy	0.0002	0.0204	0.4067	0.0501
physetc	0.0006	0.1351	0.2225	0.6075
masters	0.2087	0.1598	0.0145	11.0319
doctorat	0.0098	0.1496	0.0575	2.6013
prftlt1	0.0577	0.0473	0.0252	1.8734
prft1_3	0.1125	-0.0275	0.0195	-1.4111
prftgt3	0.3685	0.0661	0.0216	3.0590
atlantic	0.0823	-0.1027	0.0217	-4.7247
quebec	0.2591	-0.1266	0.0215	-5.8853
mansask	0.0835	0.0215	0.0220	0.9781
alberta	0.1015	-0.0078	0.0204	-0.3814
bcterr	0.0652	-0.0411	0.0241	-1.7039
pubserv	0.6584	0.0478	0.0156	3.0736

proportion male	0.5486
proportion female	0.4514

	B*	characteristic difference	male advantage	female disadvantage
intercep	9.7500	0.0000	0.1604	0.1949
age	0.0266	-0.0311	-0.0587	-0.0739
agesq	-0.0002	0.0238	0.0107	0.0143
french	0.0372	-0.0002	-0.0093	-0.0115
othlang	0.0024	0.0000	-0.0020	-0.0020
schoolpr	-0.0100	-0.0000	0.0002	0.0002
otherpr	0.0325	0.0011	-0.0012	-0.0011
parentps	-0.0150	0.0007	-0.0017	-0.0023
married	0.0447	0.0053	-0.0009	-0.0009
divsepwi	-0.0027	0.0001	0.0000	0.0000
kids87	0.0159	0.0023	0.0074	0.0059
fineart	-0.1487	0.0008	-0.0000	-0.0000
applart	0.0260	-0.0000	0.0002	0.0004
journlsm	0.0427	-0.0004	0.0000	0.0000
othhuman	-0.1138	0.0062	-0.0014	-0.0032
socanthr	-0.0788	0.0019	-0.0003	-0.0010
crimlgy	-0.0318	0.0000	0.0000	0.0000

law	0.1906	0.0019	0.0009	0.0007
econonmcs	0.0814	0.0017	0.0025	0.0015
geoenvr	-0.0359	-0.0005	0.0018	0.0012
polisci	0.1465	-0.0000	0.0012	0.0015
psych	0.0704	0.0043	0.0003	0.0002
othsocsc	-0.0854	0.0025	-0.0002	-0.0008
agric	-0.0362	-0.0003	-0.0005	-0.0003
bioetc	-0.0428	0.0001	0.0003	0.0004
homeec	-0.2594	0.0020	-0.0001	-0.0006
veternry	0.0876	0.0002	-0.0001	-0.0001
archtct	-0.0397	-0.0004	-0.0000	-0.0000
engineer	0.1746	0.0248	-0.0104	-0.0013
forestry	-0.0636	-0.0005	-0.0006	-0.0002
dentist	0.8380	0.0089	0.0038	0.0007
medicine	0.4137	0.0036	0.0012	0.0010
nursing	-0.0264	0.0014	-0.0000	-0.0027
optomtry	1.0588	-0.0011	0.0004	0.0007
pharmacy	0.1880	-0.0018	-0.0005	-0.0014
pubhlth	0.2949	-0.0002	0.0003	0.0005
othhlth	0.0696	-0.0021	0.0001	0.0011
compsci	0.1517	0.0051	-0.0017	-0.0006
math	0.1216	0.0007	-0.0016	-0.0014
chemetc	0.0828	0.0002	-0.0001	-0.0001
metrlogy	0.0436	0.0000	0.0000	0.0000
physetc	0.0582	0.0003	-0.0004	-0.0000
masters	0.1398	0.0048	-0.0040	-0.0042
doctorat	0.1287	0.0018	-0.0004	-0.0002
prftlt1	0.0211	0.0003	-0.0015	-0.0015
prft1_3	-0.0353	-0.0009	-0.0009	-0.0009
prftgt3	0.0649	-0.0036	-0.0003	-0.0004
atlantic	-0.1136	0.0008	-0.0007	-0.0009
quebec	-0.1009	-0.0007	0.0056	0.0066
mansask	-0.0416	0.0001	-0.0042	-0.0053
alberta	-0.0121	-0.0002	-0.0004	-0.0004
bcterr	-0.0388	-0.0004	0.0001	0.0001
pubserv	-0.0297	0.0070	-0.0270	-0.0511
		0.0704	0.0664	0.0620	0.1988
	percentage	35.43%	33.40%	31.17%	100.00%
	dollar value	2489	2347	2190	7026

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